

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, or claims in the application.

Listing of the Claims:

1.-24. (cancelled)

25. (Currently amended) A process for the preparation of a polymer composite comprising internally distributed deposition matter wherein the process comprises:

(a) providing a deposit of deposition matter at the surface of a solid state polymer substrate by fluid phase deposition of discrete particles or dissolved deposition matter by immersion or spraying of solid state polymer substrate with a solution, dispersion or suspension of deposition matter,

(b) drying by freezing, evaporation, heating or blotting ~~whereby the deposition matter adsorbs from liquid phase on to the polymer surface and forms an adsorption layer of deposition matter which is intact to solvent and impact effects ;~~ and then

(c) contacting the surface deposited polymer with a plasticising fluid or a mixture of plasticising fluids under plasticising conditions to plasticise and/or swell the polymer and internally distribute deposition matter, and then

(d) releasing the plasticising fluid or fluids to obtain polymer composite.

26. (Currently amended) The process of ~~A process as claimed in~~ Claim 25, wherein deposition matter is present, presented as concentration of deposition matter on polymer, in the range 1×10^1 to 1×10^3 ng/mg, or of the order of picograms or nanograms per 5g polymer, or 1×10^{-12} to 1×10^{-9} wt%.

27. (Cancelled)

28. (Withdrawn) Process as claimed in Claim 25 wherein the polymer substrate comprises a powder bed or a high porosity matrix.

29. (Cancelled)

30. (Withdrawn) A process as claimed in Claim 25 wherein the solid state polymer substrate is obtained by contacting polymer with plasticising fluid or a mixture of plasticising fluids under plasticising conditions to plasticise the polymer, and releasing the fluid in manner to obtain a solid state substrate polymer.

31. (Withdrawn) A process as claimed in Claim 25 carried out in the absence of additional solvent capable of dissolving the deposition matter.

32. (Currently amended) The process of ~~A process as claimed in~~ Claim 25, wherein immersion is for a time of the order of 1 second up to 48 hours.

33. (Currently amended) The process of A process as claimed in Claim 25, wherein drying is for a time up to 48 hours.

34. (Withdrawn) A process as claimed in Claim 25 wherein plasticising conditions comprise a temperature in the range -200°C to $+500^{\circ}\text{C}$.

35. (Withdrawn) A process as claimed in Claim 25 wherein plasticising conditions comprise a pressure from in excess of 1 bar to 10000 bar.

36. (Withdrawn) A process as claimed in Claim 25 wherein the process is carried out for a contact time of surface deposited polymer and plasticising fluid of 20 milliseconds up to 5 minutes.

37. (Currently amended) The process of A process as claimed in Claim 25, which is carried out without blending.

38. (Withdrawn) A process as claimed in Claim 25 wherein plasticising fluid is selected from carbon dioxide, di-nitrogen oxide, carbon disulphide, aliphatic C_{2-10} hydrocarbons such as ethane, propane, butane, pentane, hexane, ethylene, and halogenated derivatives thereof such as for example carbon tetrafluoride or chloride and carbon monochloride trifluoride, and fluoroform or chloroform, C_{6-10} aromatics such as benzene, toluene and

xylene, C₁₋₃ alcohols such as methanol and ethanol, sulphur halides such as sulphur hexafluoride, ammonia, xenon, krypton, and mixtures thereof.

39. (Currently amended) The process of ~~A process as claimed in~~ Claim 25, wherein deposition material is selected from the group consisting of (pharmaceutical) drugs and veterinary products; agrochemicals as pest and plant growth control agents; ~~human and animal health products;~~ human and animal growth promoting, structural, or cosmetic products, ~~including products intended for growth or repair or modelling of the skeleton, organs, dental structure;~~ and absorbent biodeposition materials for poisons and, toxins.

40. (Currently amended) The process of ~~A process as claimed in~~ Claim 25, wherein deposition matter alternatively or additionally comprises ~~function enhancing components, including~~ naturally occurring or synthetic ~~or otherwise modified~~ growth promoters, ~~biocompatibilisers,~~ vitamins, proteins, glycoproteins, enzymes, nucleic acid, carbohydrates, minerals, nutrients, steroids, ceramics, ~~and the like and functioning matter such as~~ spores, viruses, mammalian cells, plant cells, and bacterial cells.

41. (Withdrawn) Process as claimed in Claim 25 wherein polymer is selected from: polyesters including poly(lactic acid), poly(glycolic acid), copolymers of lactic and glycolic acid, copolymers of lactic and glycolic acid with poly(ethylene glycol), poly(ϵ -caprolactone), poly(3-hydroxybutyrate), poly(p-dioxanone), poly(propylene fumarate); poly(ortho esters); polyanhydrides; Poly(amino acids); polyacetals; polyketals;

polyorthoesters; Polyphosphazenes; azo polymers; synthetic Non-biodegradable
Polymers selected from: Vinyl polymers including polyethylene, poly(ethylene-co-vinyl
acetate), polypropylene, poly(vinyl chloride), poly(vinyl acetate), poly(vinyl alcohol) and
copolymers of vinyl alcohol and vinyl acetate, poly(acrylic acid) poly(methacrylic acid),
polyacrylamides, polymethacrylamides, polyacrylates, Poly(ethylene glycol),
Poly(dimethyl siloxane), Polyurethanes, Polycarbonates, Polystyrene and derivatives; and
Natural Polymers selected from carbohydrates, polypeptides and proteins.

42. (Currently amended) A process for the preparation of a polymer composite
comprising internally distributed deposition matter, wherein the process comprises:

(a) providing a deposit of deposition matter at the surface of a solid state polymer
substrate by fluid phase deposition of discrete particles or dissolved deposition matter by

(i) immersion or spraying of solid state polymer substrate with a solution,
dispersion or suspension of deposition matter, drying by freezing,
evaporation, heating or blotting or

(ii) by solid phase deposition by powder coating, dusting, rolling or
adhering; and then

(b) contacting the surface deposited polymer with a plasticising fluid or a mixture
of plasticising fluids under plasticising conditions to plasticise and/or swell the polymer
and internally distribute deposition matter; and

(c) releasing the plasticising fluid or fluids to obtain polymer composite wherein
deposition matter is present, presented as concentration of deposition matter on polymer,

in the range 1×10^1 to 1×10^3 ng/mg, or of the order of picograms or nanograms per 5g polymer, or 1×10^{-12} to 1×10^{-9} wt%.

43. (Cancelled)

44. (Withdrawn) Process as claimed in Claim 42 wherein the polymer substrate comprises a powder bed or a high porosity matrix.

45. (Currently amended) The process of ~~A process as claimed in~~ Claim 42, wherein a deposit comprises a deposition layer of deposition matter on any internal and external exposed surfaces of the polymer substrate, including any exposed surface pores; over the entire surface area or only part or parts thereof.

46. (Withdrawn) A process as claimed in Claim 42 wherein the solid state polymer substrate is obtained by contacting polymer with plasticising fluid or a mixture of plasticising fluids under plasticising conditions to plasticise the polymer, and releasing the fluid in manner to obtain a solid state substrate polymer.

47. (Withdrawn) A process as claimed in Claim 42 carried out in the absence of additional solvent capable of dissolving the deposition matter.

48. (Currently amended) The process of A~~process as claimed in~~ Claim 42, wherein immersion is for a time of the order of 1 second up to 48 hours.

49. (Currently amended) The process of A~~process as claimed in~~ Claim 42 wherein drying is for a time up to 48 hours.

50. (Withdrawn) A process as claimed in Claim 42 wherein plasticising conditions comprise a temperature in the range -200°C to $+500^{\circ}\text{C}$.

51. (Withdrawn) A process as claimed in Claim 42 wherein plasticising conditions comprise a pressure from in excess of 1 bar to 10000 bar.

52. (Withdrawn) A process as claimed in Claim 42 wherein the process is carried out for a contact time of surface deposited polymer and plasticising fluid of 1 millisecond up to 5 hours.

53. (Currently amended) The process of A~~process as claimed in~~ Claim 42, which is carried out without blending.

54. (Withdrawn) A process as claimed in Claim 42 wherein plasticising fluid is selected from carbon dioxide, di-nitrogen oxide, carbon disulphide, aliphatic C_{2-10} hydrocarbons such as ethane, propane, butane, pentane, hexane, ethylene, and halogenated derivatives

thereof such as for example carbon tetrafluoride or chloride and carbon monochloride trifluoride, and fluoroform or chloroform, C₆₋₁₀ aromatics such as benzene, toluene and xylene, C₁₋₃ alcohols such as methanol and ethanol, sulphur halides such as sulphur hexafluoride, ammonia, xenon, krypton, and mixtures thereof.

55. (Currently amended) The process of A ~~process as claimed in~~ Claim 42, wherein deposition material is selected from the group consisting of (pharmaceutical) drugs and veterinary products; agrochemicals as pest and plant growth control agents; ~~human and animal health products;~~ human and animal growth promoting, structural, or cosmetic products, ~~including products intended for growth or repair or modelling of the skeleton, organs, dental structure;~~ and absorbent biodeposition materials for poisons and, toxins.

56. (Currently amended) The process of A ~~process as claimed in~~ Claim 42, wherein deposition matter alternatively or additionally comprises ~~function enhancing components, including~~ naturally occurring or synthetic ~~or otherwise modified~~ growth promoters, ~~biocompatibilisers,~~ vitamins, proteins, glycoproteins, enzymes, nucleic acid, carbohydrates, minerals, nutrients, steroids, ceramics, ~~and the like and functioning matter such as~~ spores, viruses, mammalian cells, plant cells, and bacterial cells..

57. (Withdrawn) Process as claimed in Claim 42 wherein polymer is selected from: polyesters including poly(lactic acid), poly(glycolic acid), copolymers of lactic and glycolic acid, copolymers of lactic and glycolic acid with poly(ethylene glycol), poly(e-

caprolactone), poly(3-hydroxybutyrate), poly(p-dioxanone), poly(propylene fumarate);
poly (ortho esters); polyanhydrides; Poly(amino acids); polyacetals; polyketals;
polyorthoesters; Polyphosphazenes; azo polymers; synthetic Non-biodegradable
Polymers selected from: Vinyl polymers including polyethylene, poly(ethylene-co-vinyl
acetate), polypropylene, poly(vinyl chloride), poly(vinyl acetate), poly(vinyl alcohol) and
copolymers of vinyl alcohol and vinyl acetate, poly(acrylic acid) poly(methacrylic acid),
polyacrylamides, polymethacrylamides, polyacrylates, Poly(ethylene glycol),
Poly(dimethyl siloxane), Polyurethanes, Polycarbonates, Polystyrene and derivatives; and
Natural Polymers selected from carbohydrates, polypeptides and proteins.

58. (Withdrawn) A polymer composite when obtained by the process of Claim 25.

59. (Withdrawn) The use of a polymer composite or a scaffold thereof prepared by the
process of Claim 25, for drug delivery, in bioremediation, as a biocatalyst or biobarrier
for human or animal or plant matter, as a structural component comprising the polymer
and optional additional synthetic or natural metal, plastic, carbon or glass fibre mesh,
scrim, rod or like reinforcing for medical or surgical insertion, for insertion as a solid
monolith into bone or tissue, as fillers or cements for wet insertion into bone or teeth or
as solid aggregates or monoliths for orthopaedic implants such as pins, or dental implants
such as crowns.